CALIFORNIA MARINE LIFE PROTECTION ACT INITIATIVE
MASTER PLAN SCIENCE ADVISORY TEAM
OCTOBER 18, 2005 MEETING SUMMARY
Apple Farm - Harvest Room
2015 Monterey Street
San Luis Obispo, CA 93401

SAT members present: Mark Carr, Steve Gaines, Doyle Hanan, Linwood Pendleton, Susan Schlosser, Astrid Scholz, Dean Wendt, Mary Yoklavich

SAT members not present: Loo Botsford, Rikk Kvitek, Steven Murray, Mark Ohman, Jeff Paduan, Stephen Palumbi, Dave Schaub, Kenneth Schiff, Rick Starr, William Sydeman

Others present: Steve Barrager (SAT Chair), Heather Galindo (note taker; SAT support staff), Carrie Kappel (note taker; SAT support staff), John J. Kirlin (MLPA staff), John Ugoretz (DFG staff), Tom Barnes (DFG staff) and approximately 10 members of the public

Acronyms used: California Department of Fish and Game (DFG); California Nearshore Fishery Management Plan (NFMP); fraction of lifetime egg production (FLEP); geographic information system (GIS); marine protected area (MPA); MLPA Blue Ribbon Task Force (BRTF); MLPA Central Coast Regional Stakeholder Group (CCRSG); MLPA Central Coast Science Sub-Team (CCSST); MLPA Master Plan Framework (MPF), MLPA Master Plan Science Advisory Team (SAT); Monitoring, Evaluation, and Adaptive Management Framework (MEAMF); optimum yield (OY); state marine conservation area (SMCA); state marine park (SMP); state marine reserve (SMR); total allowable catch (TAC)

Welcome, Review of Agenda, and Recent Updates

Steve Barrager welcomed the SAT and reviewed the agenda for the meeting. He announced that the CCRSG was actively assembling MPA proposal packages and that all proposals from outside the CCRSG are due on October 15, 2005.

John Kirlin then welcomed the SAT and thanked those who had given SAT presentations at the October 2005 CCRSG meeting. He followed by saying that the CCRSG had developed over 100 individual MPA concepts and formed good working relationships. An additional set of CCRSG meetings will be held on October 20, 2005 in both the north and south areas of the central coast. The goal of these meetings will be to further refine MPA concepts and group the individual concepts into arrays for MPA proposals. John explained that the MLPA Initiative staff has already received proposals from both outside groups and individuals. These will be presented to the CCRSG. John added that the MLPA Initiative staff has begun drafting a plan for MPA monitoring and evaluation with input from members of the MLPA Central Coast Science Sub-Team (CCSST). John Kirlin ended by announcing that the BRTF had adopted the MLPA Central Coast Regional Profile and, after deciding on unresolved issues, adopted the goals and objectives package developed by the CCRSG at its last meeting.

John Ugoretz followed by explaining the 100 individual MPA concepts had to be packaged into full proposals by the CCRSG in a relatively short amount of time. He emphasized that the SAT needed to have a good discussion about how to evaluate the proposals. John Ugoretz finished

by introducing Tom Barnes of the San Diego office of DFG, who he invited to give input on fisheries issues and development of the species likely to benefit list.

Species Likely to Benefit List

Doyle Hanan and Mary Yoklavich opened the discussion by updating the SAT on recent progress on the text document accompanying the list of species likely to benefit from MPAs. During a conference call and some additional work, the sub-team developed a list of criteria and species to be included. The species included in the list should meet one or more of the criteria:

- Species occurs on the central coast
- Species has small to moderate adult neighborhood size
- Species experiences moderate to large take
- Status of species is known to be low or declining
- Status is unknown, but species shares a life history or co-occurs with a declining species
- Species has a life stage that may benefit from an MPA (e.g. as a breeding, feeding, or nursery ground)
- Species size structure is smaller due to fishing
- Species habitat is impacted by fishing

Initial comments on the text:

- Discussion about whether the criteria involving a shift to a smaller size structure should contain the phrase “due to fishing” since such a shift could be due to other causes including high recruitment. Suggestion to change the phrase to “due to take”.
- Indirect effects on species are not explicitly listed in the criteria except for the one involving habitat destruction, but they are discussed elsewhere in the text document. Some of these indirect effects include habitat damage and destruction, disturbance, species interactions, trawling and dredging, and the presence of people.
- Text had been included discussing birds, mammals, and turtles that meet the above criteria. This text was reviewed by a non-SAT expert in addition to the SAT sub-team.
- A matrix was created evaluating each species on the list for each of the criteria. The matrix is partially filled in, but more work needs to be done.
- Information about bottom type associated with each species is listed as either rock or sand. Depth range of species comes from a literature review done by students at the Bren School at UC Santa Barbara.
- Discussion about whether evaluation of species for each criteria should result in a “yes” or “no” entry to the matrix or if some finer ranking system is more appropriate. It was agreed that the former should be used because there are not good data for many of the species to support a finer ranking system.

- Potential for the list of species to be prioritized based on the number of "yeses" in response to the criteria. Alternatively, the list could be reorganized by which species meet each of the criteria. Some SAT members felt the list should not be prioritized since all of the species included are likely to benefit from MPAs in some way.
- The response of species to changes in water quality was not included in the criteria because the MLPA Initiative process does not address water quality.
- Small and moderate adult neighborhood sizes should be defined as being smaller than and equal to the SAT guidelines in the MPF, respectively.
- How should moderate to large take be defined? How should historical take be taken into account? What about species with currently low, but increasing population sizes?
- In some cases it is difficult to parse out effects on species due to changes in fishing regulations versus implementation of an MPA.
- Using the current state of a fishery as a criterion could be problematic since the status can change over time. However, the MLPA process is already designed to be adaptive.

John Kirlin clarified that species protection is one of the five goals of the MLPA and the list of species likely to benefit has at least three major roles: to aid the stakeholders in designing their MPA proposals, to aid the SAT in evaluating the proposals, and to provide information for future adaptive management processes.

John Ugoretz suggested that the SAT sub-team should work to complete the matrix of criteria and species then circulate the draft to the whole SAT with the goal of having a draft ready for the November 9-10, 2005 CCRSG meeting.

Tom Barnes from DFG gave a short presentation to the SAT about the interaction of fisheries management and MPAs. The presentation contained the following main points:

- Many of the finfish species on the draft species likely to benefit list are currently actively managed under the California Nearshore Fishery Management Plan (NFMP) and the Groundfish Management Plan.
- The process of drafting the NFMP in 2000-2001 involved consideration of how MPAs might affect optimum yield (OY) or total allowable catch (TAC). Due to a lack of previous examples, analogous situations in other California fisheries were used for comparison including the cowcod and rockfish conservation areas plus *de facto* closed areas (e.g. areas far from ports or where the bottom habitat is not conducive to fishing). In no case was OY reduced because of the closed areas. In part, this is due to the fact that recruitment from closed areas may supplement the populations in fished areas.
- Based on a graph of allowable catch under both the Pacific Fisheries Management Council and NFMP guidelines versus stock size, OY should not need to be adjusted unless more than 20% of the stock is unavailable to the fishery. This allows stock assessments to be done on the entire stock and does not require adjustments to OY if less than 20% of the stock is protected by MPAs.

- For unassessed stocks, maximum sustainable yield or allowable biological catch is based on recent catch and OY is set to half that amount. In general, this allows for conservative management of unassessed stocks, although there can be exceptions.

Discussion following the presentation involved the following main points:

- Areas such as the Cowcod Conservation Area were designed to protect Cowcod populations, but not to influence TAC or OY for other species.
- Agreement that there is a clear precedent for closures not requiring adjustments in TAC. Strong biological evidence would be required for adjustments to be made to the TAC.
- Reminder that the MLPA is not required to take fisheries management into account. It is also unlikely, but possible, that fisheries management will have to respond to MPA implementation.
- TAC is based on long-term averages of stock assessments and often has quite high confidence intervals. It would be worthwhile to track fluctuations in stock assessments over time and space.

Draft Presentation: Network Design

Steve Gaines gave a draft presentation on the concept of network design assembled with the help of other SAT members:

- MLPA was a landmark act in requiring a network of MPAs.
- Since the passage of the MLPA, other MPA networks have been designed or are currently in the planning process:
    - Channel Islands MPA network.
    - South Africa aims to have 20% of the entire coastline in MPAs by end of the decade.
    - About 33% of the Great Barrier Reef is currently designated as marine reserves.
    - Gulf of California, Cuba, and New Zealand all have planning efforts underway.
- What is a network?
    - Network is a term used in many fields with different meanings.
    - Analogous to social and computer networks whose function depends on the connections in the network.
    - Ecological networks: The connections are relatively linear for coastlines and exist through movement of individuals.
- Why bother?
    - The goal of creating sustainable populations could be achieved with a large single MPA. In general, the size of an MPA should be greater than the average scale of movement for any life stage. This reasoning has long been used in designing terrestrial parks.

  - However, there is enormous variation in distances species move and an MPA designed to accommodate this range of distances would be overkill for many species, would provide little fisheries benefit, and would provide no help to species with a range outside of the MPA.
  - Multiple smaller MPAs will not protect species whose adult range exceeds the size of individual MPAs, but will allow larvae a greater chance of settling inside an MPA. Therefore, guidelines for MPA size are based on movements of adults and larvae with small dispersal distances. Guidelines for MPA spacing are based on medium to long-range dispersal distances.
  - Much of MPA design theory could benefit from quantitative field studies.
  - Loo Botsford's model for fish shows that the fraction of lifetime egg production (FLEP) must be 35% or greater for a population to be sustainable. FLEP decreases as the distance between MPAs in a network increases.
  - In general, although there are tradeoffs, the benefits of MPA networks outweigh the drawbacks. Compared to a single large MPA, networks require less area, offer more flexibility, help to maintain genetic diversity, provide insurance against catastrophes, and minimize socioeconomic impacts.
- What should a network look like?
  - Examples of arbitrary spatial configurations were given.

Feedback on the presentation was as follows:

- Presentation should include some discussion of how MPA network design is relevant to fisheries.
- There were several comments about small changes to graphics or color schemes used in the slides and a few suggestions regarding use of language. In particular, the slides for the FLEP model results could benefit from a more dramatic color scale to indicate differences in results.
- An explanation would be useful that in order to see a network effect for species with high dispersal distances, more than two MPAs need to be included in the FLEP model.
- Multiple MPAs would keep multiple habitats open to and reduce travel costs for fishermen while minimizing other socioeconomic impacts, but still protect the geographic range of a single large MPA. An actual network is required to maintain genetic diversity and provide insurance against catastrophe.
- Larvae settling in MPAs are important because they will have a greater chance of becoming reproductive adults than outside MPAs.
- There should be more discussion of mobile versus sessile life stages (including juveniles) and species.
- There is potential for animals to actively stay within MPAs, especially if they cue into prey density. This is also more likely if MPA and habitat boundaries coincide.
- The presentation implies that overfishing is occurring outside the MPAs. In terms of the FLEP model, Steve clarified that although there is egg production outside of MPAs, it

may not constitute the 35% required for a sustainable population. In addition, MPAs can harbor bigger, more reproductive individuals and populations with higher genetic diversity that are not subject to selective fishing pressure. MPAs help insure sustainability of populations.

- Although the MLPA might be leading the way in requiring MPA networks in legislation, there are other examples emerging all over the world. These networks will allow for rigorous scientific testing of the theory behind MPA network design.
- The slide depicting the number of species with a particular average dispersal distance might be misleading because it is on a log scale. In fact, many fished species tend to fall within a fairly narrow range of dispersal distances.
- It might be helpful to indicate which dispersal distances would be encompassed by an MPA network conforming to the minimum and maximum of the SAT recommended size and spacing guidelines.
- The slide listing scientific research on additional benefits of MPAs should indicate that these fields are on the cutting edge of science.
- It is important to include other aspects important to network design such as habitat. As it stands, the presentation is largely focused on individual species and dispersal distances.
- A discussion of uncertainty should be included especially concerning the biological and socio-economic impacts of having multiple MPAs either networked or non-networked.
- The presentation emphasizes design at an ecosystem level, but it is worth considering whether the approach to designing MPAs for a single species would be different.

Evaluating MPA Packages

Steve Barrager opened the discussion on evaluating MPA packages by introducing the concept of a fictitious straw man MPA package the SAT could use to help them develop evaluation criteria. He encouraged the SAT to evaluate the strengths and weaknesses of the straw man package and to determine what information about the package was necessary to do the appropriate evaluation.

John Ugoretz then presented an overview of the straw man package emphasizing different examples of MPA size, spacing, and type arbitrarily chosen to stimulate ideas about evaluation approaches. He reminded the SAT that other things to consider were the shape of MPAs to facilitate practical enforcement and that fishing vessels could transit through or anchor in an MPA with catch on board, but some sites may alter the transits of vessels with gear in the water. John emphasized that the only take allowed in a marine reserve was some collecting for scientific or educational purposes, although collecting permits can still exclude certain areas. If any other take is allowed, then the MPA cannot be designated a marine reserve.

Main discussion points concerning the evaluation of the straw man package were as follows:

- Good biogeographic representation via a spread of MPAs throughout the study region is important.

- The presence of adjacent MPAs of different types will be important for evaluation of MPA performance and future adaptive management. (John Ugoretz mentioned that few proposals for marine parks had been raised in the previous stakeholder discussions.)
- It is important to develop measurable criteria to evaluate whether an MPA package meets its stated goals and objectives.
- A potential evaluation framework could include the following questions: 1) What goals are being addressed? 2) What are the potential costs of meeting these goals? and 3) What are the alternatives and their costs?
- Acknowledgement that not all evaluation criteria will be quantitative and evaluation of some goals and objectives may not involve science questions and would therefore fall outside the purview of the SAT. The SAT's role is to consider the pros and cons of each MPA package, but not necessarily to rank them.
- If a design does not meet a particular objective, it would be useful to provide feedback about how the design might be altered to meet that objective.
- A memo to the stakeholders should be included with the species likely to benefit list indicating how the list will be used in the evaluation process.
- Some MPAs should include deep-water habitats.
- Some objectives might be conflicting (e.g. MPA shapes taking into account habitat protection and ease of enforcement).

Requested data for evaluation of the actual stakeholder packages include:

- The type and value of fisheries in each area would facilitate an evaluation of the socioeconomic impact of particular MPAs.
- Geographic distances between habitat types taking into account both bottom type and depth.
- Geographic distances between MPAs of a certain type (i.e. reserve, park, or conservation area).
- Proximity of MPAs to educational institutions, educational opportunities, and monitoring facilities.
- A data layer indicating location of roads and public transportation routes.
- Information for the distribution of species on the species likely to benefit list that should include a column indicating ecological importance.
- The rigor and level of review of each dataset should be indicated.
- Stakeholders should indicate how their design meets objectives, but are not required by the MPF to indicate how they weighted the various objectives.

Satie Airame from UC Santa Barbara presented a summary of the efforts of students at the UCSB Bren School to translate the MPA objectives into measurable criteria. The project involves creating a table indicating which of the available GIS data layers can be used to evaluate MPA packages for fulfillment of each objective or design consideration. Preliminary

work indicates that not all objectives are equally supported by the data layers with objectives 3.1, 3.3, 3.4, and those under goal 6 having the least data layer support.

Satie explained that analyses could be done to determine how the maximum number of goals could be met while minimizing the size of individual MPAs. This tool could be used to help evaluate the packages by determining how often a particular area is indicated in analyses with different objectives. These areas common to several analyses could then be compared to MPA proposal packages as one aspect of the evaluations. The SAT requested separate analyses considering the SAT recommended habitats and CCRSG recommended habitats. Other analyses should include species distributions and proximity to population centers.

It was decided that the SAT Monitoring and Evaluation Sub-Team would work with Satie to develop measurable evaluation criteria which could then be reviewed by the entire SAT.

CCRSG Meeting Review

Mark Carr summarized the first day of the October CCRSG meeting as being focused on evaluating existing MPAs in the central California study region. John Ugoretz followed by explaining that the second day consisted of four small groups having very productive brainstorming sessions. John added that the stakeholders discussed and evaluated proposals for candidate MPAs by considering both pros and cons in a reasonable manner.

Mark Carr then reported on the questions for the SAT raised at the October CCRSG meeting. The main question involved the impact of non-extractive human activities in marine reserves on biological communities. Heather Galindo followed by explaining a short list of relevant references was being assembled by the CCSST and a draft answer to the question would be submitted to the entire SAT for review via email. Heather also explained that MLPA Initiative staff is drafting an answer for another question on Pismo Clams and she would try to circulate a draft of that response to the SAT as well.

Future Presentations and Needs

John Ugoretz briefly summarized the several ongoing efforts having to do with MPA monitoring and evaluation. MLPA Initiative staff will be holding a non-public meeting on November 1, 2005 to develop a framework for the process of monitoring and evaluating MPAs. Previous efforts included work by MLPA Initiative staff on creating the monitoring and evaluation matrix document and a presentation from Charles Wahle of the National MPA Science Center at a CCRSG meeting. John indicated that input from people currently involved in MPA monitoring would be valuable. Mark Carr added that he would present a draft presentation on monitoring and evaluation at the November 15, 2005 SAT meeting.

John Kirlin then directed a brief discussion on whether to have Steve Berkeley give a science presentation to the BRTF. Feedback from the SAT indicated that while Steve Berkeley's work on rockfish is important to the concept of MPA design, it had been well covered in a previous SAT presentation and is focused on a single species. In addition, future time in the BRTF

agenda should first be given to developing SAT presentations on networks, monitoring and evaluation, water quality, and socioeconomics.

John Ugoretz then proposed future meeting dates for the SAT:

- January 20, 2006
- March 2, 2006
- May 1, 2006

John added that an additional SAT meeting after May 1, 2005 may be required to address public comment or feedback from the California Fish and Game Commission. The SAT had a brief discussion about meeting locations and proposed alternating future SAT meetings between San Jose, CA and San Luis Obispo, CA.

Wrap Up and Public Comment

Public comment was made by one individual asking the SAT to consider animals other than fish for the species likely to benefit list, including sea cucumbers, lobsters, moon snails, and abalone. He also reminded the SAT that, under the CCRSG's goal 5, objective 1, both positive and negative impacts of MPAs must be considered. He closed by saying that information relevant to goal 3 has not been included in the data layers available to the CCRSG, but instead was being provided by two of the stakeholders.

Upcoming Meetings

The next SAT meeting will be held on November 15, 2005 in Santa Cruz, CA.